Appl. No. 10/027,669
Amendment Dated May 7, 2004
Reply to Office Action of February 27, 2004

Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A growth factor composition comprising: a polypeptide of the TGF-β superfamily, and a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD, and a solvent selected from the group consisting of water and aqueous buffer solutions, said composition being capable of promoting angiogenesis without inducing osteogenesis when administered to a living subject at a site in need of such angiogenesis.

2. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is a polymer of N-vinyl-2-pyrrolidone.

3. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is a homopolymer of N-vinyl-2-pyrrolidone.

4. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is povidone.

5. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer solubilizes said growth factor.

6. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is water soluble.

7. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is provided at a concentration of from about 0.1% weight/volume to about 70% weight/volume.

8. (Original) The composition of claim 1, wherein said vinyl pyrrolidone is provided at a concentration of from about 0.1% weight/volume to about 50% weight/volume.

9. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is provided at a concentration of from about 0.1% weight/volume to about 55%.

10. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is provided at a concentration of from about 0.5% weight/volume to about 2.5%.

11. (Original) The composition of claim 1, wherein said vinyl pyrrolidone polymer is provided at a concentration of about 1% weight/volume.

12. (Original) The composition of claim 1, wherein said polypeptide of the TGF-β superfamily comprises a Bone Morphogenetic Protein.

13. (Currently amended) A growth factor composition comprising

at least two growth factors selected from the group consisting of BMP-2, BMP-3, BMP-4, BMP-5, BMP-6, BMP-7, TGF-β1, ~~TGF-β2~~ TGF-β2, TGF-β3, and FGF-1,

a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD, and

a solvent selected from the group consisting of water and aqueous buffer solutions, said composition being capable of promoting angiogenesis when administered to a living subject at a site in need of such angiogenesis.

14. (Previously presented) A growth factor composition comprising:

a polypeptide of the TGF-β superfamily,

a growth factor selected from the group consisting of IGF-1, EGF, HGF, TGF-α, and PDGF,

a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD, and

a solvent selected from the group consisting of water and aqueous buffer solutions, said composition being capable of promoting angiogenesis when administered to a living subject at a site in need of such angiogenesis.

15. (Previously presented) A growth factor composition comprising:

BMP-2, BMP-3, BMP-7, TGF-β1, TGF-β2, and FGF

a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD, and

a solvent selected from the group consisting of water and aqueous buffer solutions, said composition being capable of promoting angiogenesis when administered to a living subject at a site in need of such angiogenesis.

16. (Currently amended) A method for inducing angiogenesis in a patient comprising: providing a growth factor composition comprising a polypeptide of the TGF-β superfamily and a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD and a solvent selected from the group consisting of water and aqueous buffer solutions; and administering the growth factor composition to a patient in need of angiogenesis, such that angiogenesis is induced without induction of osteogenesis.

17. (Original) The method of claim 16, wherein the patient is human.

18. (Original) The method of claim 16, wherein said step of administering comprises injecting the composition into the patient's body.

19. (Currently amended) The method of claim 16, wherein said step of administering comprises injecting the composition into the ~~patent's~~ patient's heart.

20. (Previously presented) A method for inducing angiogenesis in a patient in need thereof comprising:

providing a growth factor composition comprising a polypeptide of the TGF-β superfamily, a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD, and a solvent selected from the group consisting of water and aqueous buffer solutions; and

administering the growth factor composition to said patient subcutaneously .

21. (Previously presented) A method for inducing angiogenesis in a patient in need thereof comprising:

providing a growth factor composition comprising a polypeptide of the TGF-β superfamily, a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to

about 20 kD, and a solvent selected from the group consisting of water and aqueous buffer solutions; and

administering the growth factor composition to said patient intramuscularly.

22. (Previously presented) A method for inducing angiogenesis in a patient in need thereof comprising:

providing a growth factor composition comprising a polypeptide of the TGF-β superfamily, a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD, and a solvent selected from the group consisting of water and aqueous buffer solutions; and

administering the growth factor composition to said patient intravenously.

23. (Original) A method for treating ischemic tissues, comprising: providing a growth factor composition comprising a polypeptide of the TGF-β superfamily and a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD and a solvent selected from the group consisting of water and aqueous buffer solutions; and administering the growth factor composition to the ischemic tissue.

24. (Original) The method of claim 23, wherein the ischemic tissue is myocardial tissue.

25. (Original) The method of claim 24, wherein said step of administering comprises injecting the composition into the myocardial tissue.

26. (Original) The method of claim 25, wherein the composition is a liquid having a viscosity of less than about 3 cP.

27. (Original) The method of claim 25, wherein the composition is a liquid having a viscosity of less than about 2.5 cP.

28. (Original) The method of claim 25, wherein the composition is a liquid having a viscosity of less than about 2 cP.

29. (Original) The method of claim 25, wherein the composition is a liquid having a viscosity of less than about 1.5 cP.

30. (Currently amended) A method of promoting soft tissue regeneration in a living subject, comprising: providing a growth factor composition comprising a polypeptide of the TGF-β superfamily and a carrier comprising a vinyl pyrrolidone polymer having a molecular weight of from about 2.5 kD to about 20 kD and a solvent selected from the group consisting of water and aqueous buffer solutions; and administering the growth factor composition to the soft tissue, such that angiogenesis is induced at said site without induction of osteogenesis.

31. (Currently amended) A method for increasing the bioavailability of a growth factor at a site where soft tissue regeneration without induction of osteogenesis in a living subject is desired, comprising the steps of: providing said growth factor comprising a protein of the TGF-β superfamily disposed in an aqueous medium comprising a solvent selected from the group consisting of water and aqueous buffers; adding a vinyl pyrrolidone polymer to the medium; and administering said medium comprising said growth factor and said vinyl pyrrolidone polymer to said site, such that angiogenesis is induced at said site without induction of osteogenesis.

32. (Previously presented) A method for inducing angiogenesis comprising:

providing a composition containing a mixture of bone-derived growth factors and a carrier comprising a vinyl pyrrolidone polymer; and

administering said composition directly to an ischemic site in an individual in need of angiogenesis.

33. (Previously presented) The method of claim 32 wherein the amino acid content of said mixture of bone-derived growth factors comprises:

about 20-25 mole% acidic amino acids (Asp (+Asn) and Glu (+Gln)),
about 10-15 mole% hydroxy amino acids (Ser and Thr),
about 35-45 mole% aliphatic amino acids (Ala, Gly, Pro, Met, Val, Ile and Leu),
about 4-10 mole% aromatic amino acids (Tyr and Phe), and
about 10-20 mole% basic amino acids (His, Arg and Lys).

34. (Previously presented) The method of claim 32 wherein the amino acid content of said mixture of bone-derived growth factors comprises:

about 23.4 mole% acidic amino acids (Asp (+Asn) and Glu (+Gln)),
about 13.5 mole% hydroxy amino acids (Ser and Thr),
about 40.0 mole% aliphatic amino acids (Ala, Gly, Pro, Met, Val, Ile and Leu),
about 6.8 mole% aromatic amino acids (Tyr and Phe), and
about 16.6 mole% basic amino acids (His, Arg and Lys).

35. (Previously presented) The method of claim 32 wherein about 60% of the protein content of said bone-derived growth factor mixture is histones, ribosomes and growth factors.

36. (Previously presented) The method of claim 32 wherein said composition comprises a synergistic combination of bone-derived growth factors with respect to enhancing proliferation, migration and/or differentiation processes essential to angiogenesis, compared to that obtained with a single bone growth factor.